

SECTOR ASSESSMENT (SUMMARY): TRANSPORT, AND INFORMATION AND COMMUNICATION TECHNOLOGY

1. Sector Performance, Problems, and Opportunities

1. Transport has played an important role in helping the People's Republic of China (PRC) achieve impressive rates of economic growth and poverty reduction. The country invested 5.4% of its gross domestic product (GDP) in transport between 2006 and 2011, and transport assets have increased rapidly as a result. However, even this heavy investment did not keep pace with the rapid 10% annual growth in demand. The rapid growth in transport infrastructure has also led to new challenges, including rapid urbanization, unprecedented growth in motor vehicle traffic, a rise in traffic accidents, and the need for greater investment and capacity for managing the new assets. In addition, the country's transport sector needs to become greener and more sustainable and reduce its energy use and carbon dioxide emissions.

2. **Project context.** Anhui Province in the central region of the PRC has lagged in economic development, but is now starting to catch up. About 56% of its 59.7 million people lived in rural areas in 2011. At 430 inhabitants per square kilometer, density is high, making land availability limited. Despite economic expansion in the PRC since the last three decades, Anhui's GDP per capita of about \$4,200 in 2011 was far below the rates in the adjacent provinces of Jiangsu (\$11,000 in 2012) and Zhejiang (\$10,200 in 2012). Nonetheless, Anhui benefits from its proximity with these more prosperous provinces and is increasingly able to capitalize its large, skilled, and comparatively inexpensive work force to attract industries relocating from the coast or from Taipei, China. As a result, Anhui has maintained a two-digit annual GDP growth during 2011-2012. Production levels have increased faster than the national average, as has the province's per capita rate of consumption, which reached 77% of the national average in 2011, up from 70% in 2005.

3. **Transport network.** To develop further as an industrial center, Anhui needs a more developed transport network that has quality connections to the coast. The province's flat terrain and population density mean that it can upgrade its transport infrastructure at comparatively less cost than the western regions of the PRC. The government invested about CNY136 billion (\$22 billion) in roads and inland waterways during 2007–2012, or 1.9% of provincial GDP. This was well below the PRC average but significantly improved transport infrastructure. The development needs of Anhui's transport network are evolving. For instance, the government emphasized expansion of the provincial expressway network, which grew to 3,000 kilometers (km) in 2011, comparable to those in Zhejiang and Jiangsu. However, Anhui's non-tolled trunk road network does not have the capacity to accommodate traffic demand. It is mainly composed of two-lane roads—10,640 km of class II highways as of 2011. The province had only 627 km of class I four-lane highways in 2011, compared with totals of 4,565 km of 4- or 6-lane class I roads in Zhejiang and 9,949 km in Jiangsu.

4. Another of Anhui's geographical advantages is the province's year-round access by water to the coast and international sea routes through the high-class 10.5-meter-deep channel provided by the Yangtze River. This allows oceangoing vessels to use all of Anhui's main river ports, and provides low-cost transport to the major cities of Shanghai to the east and Chongqing to the west. The three largest Anhui ports on the Yangtze can accommodate ships of up 10,000 deadweight ton (dwt), and two others have 5,000 dwt berths. The two largest ports had

throughputs of 82.5 million dwt and 68 million dwt in 2012.¹ While the Yangtze is fed by a good natural river network in Anhui, the province has underinvested in the development of these navigation channels. Many tributaries are passable only by small vessels and only during the wet season. In 2007, the province began scaling up investments to address these limitations. Investments in inland waterways reached CNY3.3 billion (\$540 million) in 2012, ten times the amount invested in 2006.

5. **Transport demand.** With variations between subsectors, the demand for transport in Anhui has generally grown at the same pace as the provincial economy. The rail sector has been the least dynamic, showing average annual freight growth of 2.3% in ton-kilometers and a passenger-kilometer growth average of 7.9% during 2006–2011. Inland waterway transport (IWT) which has carried more freight than railways since 2008, has grown much faster, as has road transport. IWT traffic has been rising by 31% annually since 2005. Demand for road transport is also growing rapidly, and the number of passenger cars reached 30 per 1,000 people in Anhui in 2011, a 325% rise over 2005. Nonetheless, this ratio is less than 7% of that in the United States and Europe, where there are 450–500 passenger cars per 1,000 people. Demand for cars and car travel would need to grow at 15% a year for 20 years to reach current developed country levels. Table 1 shows the recent trends in the province’s main transport data indicators.

Table 1: Anhui Transport Sector Data, 2005–2011

Item	2005	2006	2007	2008	2009	2010	2011
Real GDP growth (%)	11.0	12.5	14.2	12.7	12.9	14.6	13.5
Population (million)	61.20	61.10	61.18	61.35	61.31	59.57	59.68
GDP per capita (current CNY)	8,742	10,004	12,032	14,428	16,413	20,749	25,638
Transport Infrastructure							
Railway length (km)	2,353	2,387	2,387	2,871	2,850	2,850	3,121
Inland waterway length (km)	5,587	5,596	5,596	5,576	5,596	5,596	5,596
Overall highway length (km)	72,807	147,611	148,372	148,827	149,184	149,382	149,535
Highway length, class II or higher (km)	11,472	11,256	12,392	12,968	13,597	13,928	14,276
Transport Investments							
Road (billion CNY)	17.3	22.8	21.9	15.6	17.0	17.8	22.6
IWT (billion CNY)	0.3	0.3	0.8	1.7	2.1	1.9	2.6
Road and IWT (% of GDP)	3.3	3.8	3.1	2.0	1.9	1.6	1.6

CNY = yuan, GDP = gross domestic product, IWT = inland waterway transport, km = kilometer

Note: The methodology used to compute highway transport volumes and distances changed in 2007, and the classifications of the road network was altered in 2006. This limits the relevance of comparisons between the annual figures and trends before and after the changes. Investment data include only January–November investments. In 2012, road investments increased to CNY29 billion for roads and CNY3.3 billion for inland waterways.

Sources: China Statistics Yearbooks, 2006–2012; Ministry of Transport website, accessed on 8 July 2013 at <http://www.stats.gov.cn/tjsj/ndsj/2012/indexeh.htm>.

6. **Road network management.** The Anhui Provincial Department of Transport (APDOT) oversees the planning and management of the transport network. Because the focus of its investments was shifting to non-tolled roads, which have more local benefits, the provincial government decentralized its road sector responsibilities to the lower levels of government in 2012. County governments are responsible for highway construction and maintenance. The APDOT remains in charge of overall planning and controls central and provincial subsidies that are passed to the lower levels of government.

¹ By comparison, the largest port in the world—Shanghai—has a throughput of 700 million tons. The fourth and fifth largest ports in the United States (Beaumont, Texas and Long Beach, California) have throughputs of about 75 million tons.

7. **Maintenance expenditures.** The APDOT spent about CNY1.2 billion (\$215 million) on road maintenance in 2012, which was 3.9% of its road sector budget for that year (Table 2). Financing for maintenance was severely constrained in 2011–2012, dropping from a peak of CNY2.9 billion in 2010. The local governments that had gradually taken over the management of the networks have reduced emphasis on periodic maintenance and road rehabilitation and put more on road construction. Since a large part of the network is recently built and still in good condition, maintenance needs are low for now. In 2012, the APDOT estimated that 82.7% of national roads and 78.8% of provincial roads were in good or excellent condition. This is above the national averages of 78.8% for national roads and 75.8% for provincial roads. Only 4.9% of the province's national roads and 8.2% of its provincial roads were in poor or very poor condition. In the long run, however, local governments will need to increase their financing for road maintenance to sustainable levels. Maintenance funding deficits are common in the PRC's central and western provinces.²

Table 2: Anhui Provincial Department of Transport—Road Sector Financing, 2005–2012

Item	2005	2006	2007	2008	2009	2010	2011	2012
Revenue								
1 Road maintenance fees	2,174	2,691	3,254	3,817	3,008	3,303	3,416	3,391
2 Toll revenue	5,405	5,804	6,851	7,400	7,675	9,415	10,726	11,247
3 Other user fees	642	664	716	768	767	941	1,070	1,120
4 Subsidy from MOT	1,861	2,212	3,234	2,625	2,830	2,510	5,510	6,070
5 Local budget allocation	-	20	-	-	80	80	210	710
6 Bank loan	6,155	5,000	5,200	3,900	9,670	11,446	10,438	10,141
7 Self-raised	4,842	5,637	5,800	1,871	-	-	-	-
8 Other funds	809	906	990	-	-	-	-	-
Total	21,888	22,934	26,045	20,381	24,030	27,695	31,370	32,679
Expenditures								
1 Road construction or upgrades	19,176	20,139	23,034	17,180	21,008	23,896	28,082	30,320
2 Taxes	120	128	140	115	-	-	-	-
3 Road safety	42	46	53	56	57	55	43	34
4 Intermediate and heavy maintenance	1,113	1,178	1,266	1,360	1,656	2,182	1,648	612
5 Routine maintenance	307	316	362	400	497	720	616	669
6 Management and research	218	225	240	250	627	600	839	744
7 Repayment of interest and principal	912	901	950	1,020	185	242	142	300
Total	21,888	22,933	26,045	20,381	24,030	27,695	31,370	32,679

MOT = Ministry of Transport.

Source: Anhui Provincial Department of Transport.

8. **Road safety.** According to the province's traffic police, 2,669 deaths occurred due to road accidents in Anhui in 2012, a rate of 4.5 fatalities per 100,000 people. This is a moderate level by PRC standards. The national ratio is 5.1 per 100,000. However, accidents in Anhui are four times more likely to result in fatalities than in the rest of the country. The accident and fatality rates are highest on the province's class I roads. This is because the traffic levels and speeds on these roads are similar to those on expressways, but the class I roads have fewer safety features than expressways and need traffic safety improvements.

² See ADB. 2012. *Financing Road Construction and Maintenance after the Fuel Tax Reform*. Manila.

2. Government's Sector Strategy

9. Transport sector policy in the PRC is guided by the Twelfth Five-Year Plan for 2011-2015, which builds upon the agenda of sustainable transport development initiated by the eleventh five-year plan.³ The government placed more emphasis in the twelfth plan on green, low-carbon growth and coordinated urban and rural development with improving basic public services. The plan includes the objective of developing an integrated transport system that provides high-quality, efficient, and affordable transport services in a safe and environmentally sound manner. The twelfth plan is pursuing reforms in the sector to make it more sustainable and greener.

10. The Anhui provincial government's vision for transport is to support sustained growth and poverty reduction in Anhui through the development of an integrated, high-quality transport network. It plans to increase the length of the non-tolled provincial and national trunk road system from 10,000 km in 2013 to 17,000 km in 2030. Road sector investments are expected to rise from CNY100 billion (\$16.4 billion) in the eleventh plan period (2006–2011) to CNY160 billion (\$26.2 billion) under the twelfth plan (2011–2015). As of July 2012, the provincial government was considering an adjustment that would increase the twelfth plan spending target to CNY200 billion (\$32.8 billion).

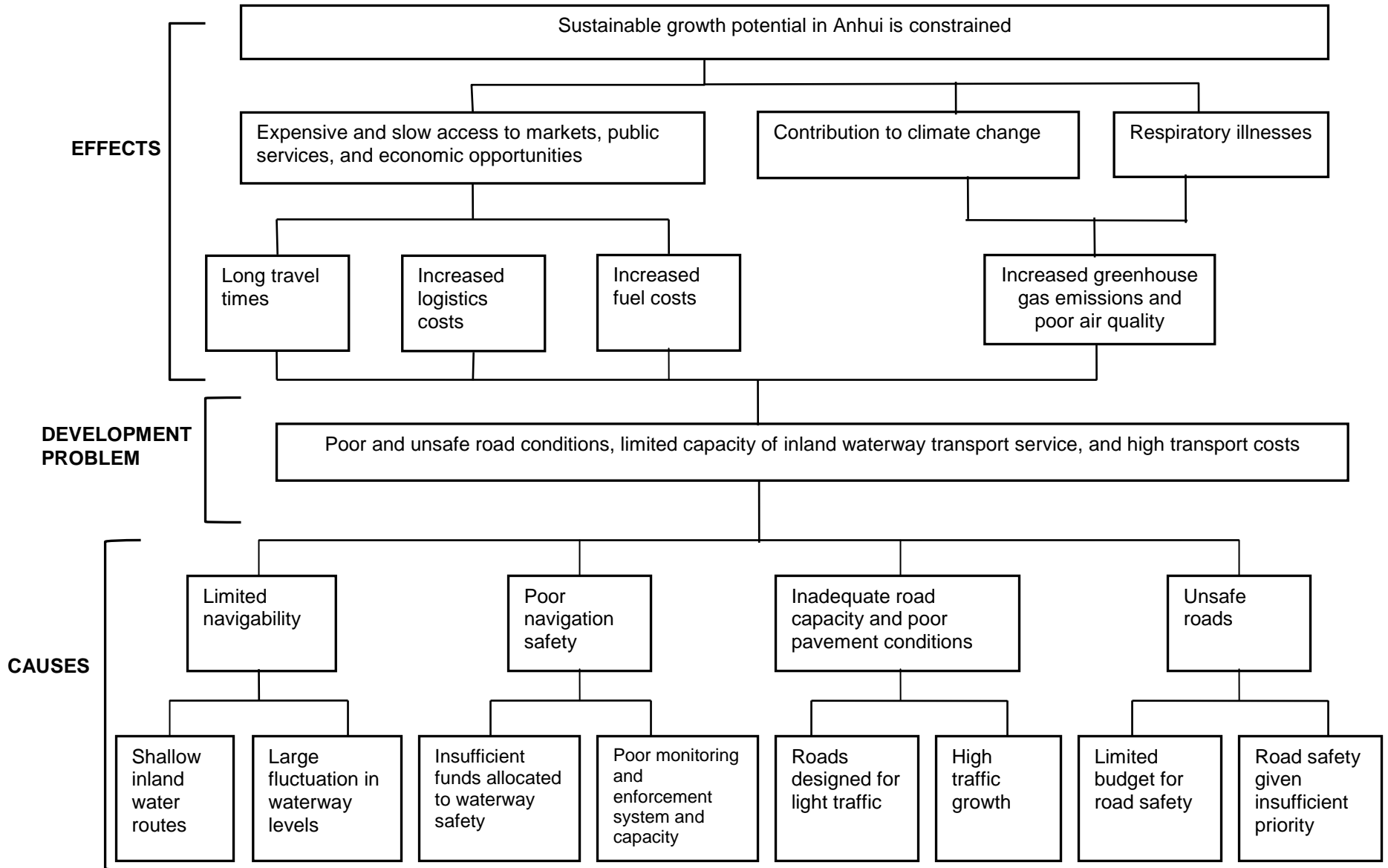
3. ADB Sector Experience and Assistance Program

11. ADB has been a key development partner in the PRC's transport sector since 1991. Under its Sustainable Transport Initiative Operational Plan approved in 2010, ADB established new strategic directions for its transport operations to 2020. The initiative calls for ADB to scale up operations in four focus—urban transport, response to climate change, cross-border transport and logistics, and road safety and social sustainability. In line with the initiative, ADB has phased out support for expressways and has begun to diversify its transport assistance into urban transport, inland waterways, and logistics. It has also taken steps to provide assistance in the road subsector for better road asset management and road safety. ADB has been supporting railway reforms to make the railway subsector more responsive to market needs. It has financed the procurement and installation of equipment to improve railway energy efficiency and safety. ADB's lending to the transport sector during 2006–2011 totaled \$4.7 billion.

12. Under ADB's country partnership strategy for the PRC for 2011–2015, ADB will promote inclusive growth and environmental sustainability by helping to develop a more efficient, safe, green, and sustainable transport system (footnote 3). ADB will support (i) low-carbon transport modes and routes; (ii) public transport and nonmotorized transport systems in urban areas; (iii) roads (other than expressways) and road safety; (iv) integrated multimodal passenger and logistics policies, facilities, and systems; (v) travel demand management; (vi) energy-efficient technologies, intelligent transport systems, and emissions control and monitoring; and (vii) climate change mitigation and adaptation. ADB will continue to promote synergies with subregional cooperation programs and integrate crosscutting initiatives, including knowledge solutions, and gender mainstreaming.

³ ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.

Problem Tree



Sector Results Framework (Transport Sector, 2011–2015)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Outcomes with ADB Contributions	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
<p>The movement of people and goods in the People's Republic of China is made more efficient, inclusive, sustainable, and safe</p>	<p>Rail passenger traffic grows by 4% per annum, from 876 billion passenger-km in 2010.</p> <p>Rail traffic for freight grows by 3% per annum, from 2,733 billion ton-km in 2010.</p> <p>Railway energy consumption per unit of traffic is reduced by 5% in 2015 from 4.94 tons of standard coal equivalent per million ton-km in 2010.</p> <p>Inland waterway freight traffic grows by 1% per annum from 433 billion ton-km in 2009.</p> <p>In areas supported by ADB urban transport projects, public transport ridership increases by 5% by 2015 from 2010 levels.</p> <p>In areas supported by ADB road projects, the road accident fatality rate per vehicle-km and per 100,000 population in 2015 is 10% lower than in 2010.</p>	<p>Integrated, low carbon transport system is expanded, improved, managed, and maintained.</p>	<p>Rail route network is expanded from 91,000 km in 2010 to about 120,000 km by 2015, including 45,000 km of high speed railway network that can carry traffic at more than 200 km per hour.</p> <p>42 national comprehensive transport hubs are developed by 2015.</p> <p>High class (class III and above) inland waterway network is expanded from 10,000 km in 2010 to more than 13,000 km by 2015.</p> <p>In areas supported by ADB projects, new bus rapid transit systems in operation by 2015 (baseline: zero).</p> <p>In provinces supported by ADB road projects and technical assistance, financing for road maintenance increases from its current amount by project completion.</p>	<p>Planned key activity areas: (i) lending operations with a total investment of \$2.71 billion in (2011–2014 in rail transport, especially regional or subregional links; (ii) inland waterway transport; urban transport; (iii) road asset management; rural transport; and (iv) road, rail, and inland waterway safety.</p> <p>Pipeline projects (2011–2014), totaling \$2.71 billion: (i) railway (\$1,160 million), (ii) road (\$980 million), (iii) urban transport (\$370 million), and (iv) inland waterway (\$200 million)</p> <p>Non-lending programs in fuel tax reforms, low-carbon urban transport, intermodal logistics, energy efficiency, and safety</p> <p>Knowledge products based on technical assistance findings and policy notes aimed at supporting government policy making</p> <p>24 ongoing projects totaling \$6.2 billion at the end of 2010</p>	<p>Pipeline projects: The first bus rapid transit system operational in Lanzhou</p> <p>About 650 km of ordinary roads rehabilitated and operational</p> <p>Road asset management system established in one province and operational</p> <p>Ongoing projects:</p> <p>1,947 km of new railways built and 21 km of urban roads upgraded in Xi'an and Lanzhou</p> <p>1,883 km of expressways built</p> <p>3,881 km of local roads rehabilitated</p> <p>1,308 km of rural roads built or rehabilitated</p>

ADB = Asian Development Bank, km = kilometer.
Source: Asian Development Bank estimates.